DOCUMENT RESUME

ED 325 085 IR 014 671

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TITLE A Teacher-Centered Implementation Strategy for Computer Integration.
PUB DATE Mar 90
NOTE 5p.; Paper presented at the International Conference on Technology and Education (7th, Brussels, Belgium, March 20-22, 1990).
PUB TYPE Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adoption (Ideas); Change Strategies; Check Lists; Computer Assisted Instruction; *Computer Software Selection; Foreign Countries; *Inservice Teacher Education; Secondary Education; *Secondary School Teachers; *Teacher Attitudes; *Teacher Role
IDENTIFIERS *Netherlands

ABSTRACT

When considering the use of computers in their lessons, two questions are important for teachers: how to select courseware and how the role and practice of the teacher may change by using computers. To answer the first question, a courseware-selection checklist was developed and its use by teachers was investigated. The checklist serves the function of helping teachers select courseware in order to meet a specified goal with a specified audience. Concerning the second question, observations were conducted to determine how a group of teachers were using computers and interviews were held with these teachers to become aware of their experiences, their feelings, and their problems. The results of these investigations are being used to develop a school-based workshop to inform non-computer-using teachers of the possibilities, advantages, and the non-threat of using computers, and to support these teachers with examples and suggestions. (Author)

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# A TEACHER-CENTERED IMPLEMENTATION STRATEGY FOR COMPUTER INTEGRATION

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International Conference on
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Brussels, Belgium
March 1990

IR014471

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Paper presented at the 7th ITCE, Brussels, March 1990.

# A TEACHER-CENTERED IMPLEMENTATION STRATEGY FOR COMPUTER INTEGRATION

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## ABSTRACT

When considering the use of computers in their lessons, two questions are particularly important for teachers: how to select courseware and how the role and the practice of the teacher may change by using the computer. To answer the first question, a courseware-selection checklist was developed and its use by teachers was investigated. The checklist serves the function of helping teachers select courseware in order to meet a specified goal with a specified audience.
Concerning the second question, observations were conducted to determine how a group of teachers were using computers and interviews were held with these teachers to become aware of their experiences, their feelings, and their problems. The results of these investigations are being used to develop a school-based workshop to inform non-computer-using teachers of the possibilities, the advantages, and the non-threat of using computers and to support these teachers with examples and suggestions.


## CONTEXT

In 1987 the Dutch Minister of Education and Science started the Experimental Schools Project (ESP). One part of this R&D-project is being carried out by two pilot schools for non-vocational secondary education (Grades 7-12) in the city of Enschede and a team of researchers from the University of Twente. One school consists of about 1000 students and 70 teachers, the other school comprises about 1700 students and 100 teachers. The schools are equipped with 30 computers each, spread over two computer classrooms, and receive funding for 25 hours a week of released time for teachers participating in the project and 10 hours a week of released time for two computer coordinators.
The aim of the ESP is to investigate various ways of realizing computer integration in the pilot schools. This paper deals with COMPRO (Computers in Pilot Schools), one of the research projects of the ESP. COMPRO focuses on the implementation of computers at the level of the teacher. For teachers, two questions are particularly important with respect to their decisions to use or not to use computers. The first question is how to make a selection from available courseware. The other question is how the instructional practice and role of the teacher is changing by using computers in his lessons.

## THE SELECTION OF COURSEWARE

There are many checklists for evaluating courseware. The problem is that most of these checklists focus on technical and more general aspects and not on the specific questions of an individual teacher. A teacher judges courseware from the points of view of compatibility with curriculum objectives, of ease of use, and of appropriate reading level. He is also concerned with the utility of the courseware for his lessons. That is the reason why we are using the term "selection" and not evaluation. Selection relates to the decision of which courseware is appropriate to meet a specified goal with a specified audience. The teacher can make use of the results of an evaluation of the courseware by others, but the final selection is an individual process.

In this context, the researchers of the COMPRO project have developed --with the assistance of the teachers of the pilot schools-- the courseware selector. Three situations can be distinguished when a teacher is interested in the selection of courseware:

- He has the intention to use courseware, without having available some packages and without having a specified subject in mind.
- He has no courseware available, but he has a particular subject and audience in mind.
- There is some courseware available and the teacher wants to assess its utility.

The courseware selector is useful in each of these situations. It consists of three parts: a guide for searching, a guide for reading, and a guide for examining.

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The **guide for searching** gives an overview of sources of descriptions, evaluations, experiences of users, and other information about courseware. The guide for searching does not contain the descriptions or evaluations themselves. This guide draws the teacher's attention to the available sources were he can find information.

The **guide for reading** is a checklist of aspects the teacher has to pay attention to when studying the documentation and other information on courseware. The guide for reading renders assistance to the teacher who is using the available information to make a quick and effective selection of useful courseware packages, or to make a judgement of one package. For example, compatibility with the curriculum is an important criterion for teachers. It is possible to investigate this criterion by reading the documentation of the courseware. Examples of relevant points of interest are:

- Who is the target group of this package?
- Does the subject and the content fit with the available method used in the classroom?
- What are the objectives?
- What does it cost to use the package with 30 students in the computer room?

In the preceding activities no time is spent on looking at the courseware itself. Reasons for this are that the courseware is not always available and examining it is a time-consuming activity. *Reading about* courseware is faster than *having a look at* courseware. And why not make use of the experience and expertise of others? Nevertheless, to form an opinion about the usefulness of a package after the reading stage it is necessary to examine the courseware itself.

The **guide for examining** is developed to check the appropriatenes of a software package for the teacher's own lessons. When available, the teacher can make use of the results of the guide for reading. Examples of points of interest are:

- What content, terms, definitions, and applications are important? Which are superfluous or disturbing?
- Does th courseware fitts with the entry level of the students? What prior knowledge is necessary?
- What technical knowledge does the student need to operate the computer?
- Is the courseware motivating?

In a first evaluation study of the courseware selector, the teachers took the view that the selector seems to be an attractive help, but it has not really been used. In order, therefore, to become familiar with the selector, a three-hour workshop for teachers has been organised. During the workshop, a courseware package, together with the printed information about it, has been screened individually relative to its usefulness, by using the selector, and the results are discussed with a colleague. Later on, when there is an opportunity for the teacher to fit the courseware into a lesson, the findings of the courseware selector can be evaluated.

## THE ROLE AND PRACTICE OF THE TEACHER

The second research question is dealing with the changing role and practice of the teacher by using the computer.
The use of computers in lessons is for teachers a new situation for which most of them are not prepared. In anticipation of the goal of setting up a workshop to make theachers familiar with the utilisation of computers, information was collected on the educational use of computers through an exploratory project involving 15 teachers. This information will be used to give insight on ways teachers use computers, and to establish a source for suggestions and advice.

Four questions were investigated.

- How the teacher had prepared his lesson?
- What were the problems the teacher was confronted with during the lesson?
- What the teacher discovered about his role during the lesson?
- What type of instructional and managerial activities the teacher performed during the lesson?

The collection of information was done by observing for each of the 15 teachers, one lesson where the computer was being used in instructional setting, followed by an interview with the teacher. The half-structured interview was designed to get information relative to the first three questions. The observation was focused on the fourth question. Only some of the results of these observations and interviews are presented in this paper.

Concerning the preparation of the lessons, none of the teachers had developed his or her own courseware. They all made use of existing packages. The most important criterion in the software selection was the fit of the courseware with the regular curriculum. The preparation itself consisted of working through the courseware on the basis of the printed information and the software in terms of the tasks for the student, by consulting the teacher's manual. The possibility of being present at a computer lesson of a colleague had not used. Each teacher had prepared his lesson on his own.

A problem many teachers were confronted with was the great difference in time different students needed to complete the same package. Even when the teachers were aware of this difference, a result of individualization, they were surprised by its magnitude. Also the teachers were surprised that during the computer lessons some concepts and terms in the software were not known by the students. At the preview of the courseware, the teachers did not pay adequate attention to the factual knowledge of their students. Most of the teachers were at the beginning more sensitive to potential technical problems. They were very happy to have the support of an experienced colleague or the computer assistant.

By using computers the students were often learning in a different way and therefore the teacher had to fulfil other roles compared to those in the normal classroom situation. For example, due to the individualization of student learning, the teacher is often more a consultant than the central source of information. Most of the teachers considered this to be a positive aspect, but others had difficulties with this change. Those with difficulties often have the perception they have lost all track of the situation and that they are more or less superfluous.

As another example, one of the traditional managerial activities of the teacher is to start and end the lesson. In the case of computer lessons however, the students often start working when entering the classroom. Closure activities at the class level were most of the time impossible due to the differences in learning pace. During the lessons all the teachers were remarkably active even when the students were busy. About the half of the time the teachers were busy with management activities, such as the organisation of groups and the distribution of material, and keeping an overview of student activity. The rest of the time was used for instructional activities involving three focuses: the content, the courseware and hardware, and the computer-delivered exercises. Here the teachers spent considerable time in assisting the students to solve the exercises. The amount of demands for help when students were working with drill & practice packages was remarkable. When having problems with finding the right answer, the student tended to prefer to consult the teacher, even when the program contained an explanation of the subject.

The data from these four questions will be used to develop a school-based workshop to inform non-users of the possibilities, the advantages, and the non-threat of using computers and to support them with examples and advice.

## CONCLUSION

One of the features of this project is the interdependence of research and inservice training. The different initiatives for staff development and the school-centered inservice training are inspired by the problems with which the schools are confronted. The content of the training is also determined by the results of the investigation in the school.
A second general remark regards to scope of reference of the teachers when making decisions about using computers. Most of the teachers refer to their normal habitual classroom practice when selecting courseware or when defining their roles. Rarely if ever does a teacher reason from a theoretical focus on the innovation in education. His first concern is how to use computers in his regular teaching practice, not how "good teaching" looks and how computers can contribute to it. Perhaps, a final conclusion of this overall project will be that to realise a valuable integration of computers in education, it will be necessary to focus the discussion no longer on computers, but on how to think and make decisions with the improvement of education as the goal.